

Tennessee Pollution Prevention Partnership Success Story



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Hazardous Materials Source Reduction

The Member

Saturn Corporation, a General Motors subsidiary, has a highly integrated automotive manufacturing and assembly complex of over seven million square feet in Spring Hill, Tennessee. Approximately 6,800 Saturn team members are involved in producing spaceframe components and body panels, painting vehicles, machining and assembly of engines and transmissions, vehicle assembly, warehousing for retailer parts, and ancillary activities. The facility produces Saturn ION sedans and coupes and the VUE compact SUV.

The Story

Building on previous pollution prevention efforts, Saturn identified three (3) additional opportunities in 2002-2003 to further reduce the environmental footprint from our operations:

Paint preparation-hazardous material substitution

Painting vehicles involves a series of cleaning, rinsing, conditioning, and coating of parts to provide corrosion protection, aid noise reduction, and enhance appearance. One of the coatings applied early in the process, called the "E-coat" layer, ensures even build-up of subsequent coatings and thorough painting of the car part.

Typically, the E-coat material contains a compound with about 4% lead. Due to the toxicity level of the lead, E-coat related solid waste is characterized as a hazardous waste under EPA regulatory classifications, and is disposed in an EPA permitted hazardous waste landfill. In June, 2002, Saturn started replacing this material with an E-coat material containing zero (0%) percent lead.

Similarly, in November, 2002, Saturn substituted a "chrome-free" phosphate sealant rinse, used early in the painting process to induce improved corrosion resistance. The original rinse material contained about 20% of a chromium compound.

Paint solvents-use reduction

In painting vehicle parts, paint-purging solvents are necessary in some areas to facilitate color changes and keep paint application spray nozzles free of material build-ups that could affect paint quality. The solvents are captured in a recovery system for off-site reclamation and reuse by the solvent supplier.

Starting in July 2002, Saturn chemical suppliers and Paint Shop team members worked together to reduce purge solvent use by more than forty percent (40%) from baseline amounts on a per vehicle basis.

Gasoline

Gasoline is stored in bulk tanks, and distributed to the Assembly plant's Fluid Fill area for addition into Saturn vehicles. Occasionally, unusable gas is collected, such as residues in tanker truck hoses, scrapped gasoline tanks or vehicles. Traditionally, this material was disposed as a hazardous waste at an off-site hazardous waste disposal facility. Saturn initiated a new process in February 2003 to reuse some of this gasoline on-site in farming equipment, with expected reductions in hazardous waste generation and handling requirements.

The Success

Implementing new e-coat and phosphate rinse materials required hazardous material review and approval through established purchasing procedures, making process substitution changes, monitoring usage, and validating waste and wastewater characterizations.

The purge solvent reduction was accomplished through standardizing and minimizing the duration and frequency of solvent purge cycles required in one area of Paint, monitoring paint quality impacts, and expanding process changes to other areas.

Alternatively using otherwise wasted gasoline as fuel involved review of applicable regulations and EPA interpretive documents, communicating handling changes to affected personnel, evaluating the gasoline quality, and tracking amounts used.

Organizational benefits realized from these efforts include cost savings from reduced purchase expenses, treatment and disposal expenses, (totaling more than \$180,000, primarily from purge solvent reductions); reduced potential health and safety risks and liabilities, and support of ISO 14001/EMS continual improvement objectives and targets.

The Pollution Prevented

E-coat related hazardous waste, in the form of lead-laden filters, is reduced by about two (2) tons per year.

An estimated three (3) tons per year of a chromium compound is eliminated from process wastewater requiring treatment.

Purge solvent usage is reduced by over 60,000 gallons per year. This represents a projected avoidance in hazardous waste in excess of thirty (30) tons and air emissions of about forty (40) tons (Volatile Organic Compounds--VOC's) for 2003.

The projected reduction in hazardous waste from waste gasoline is one (1) ton per year.